BE -15

INCULCATING AWARENESS ON ANIMAL AND PLANT BIODIVERSITY USING PROJECT-BASED LEARNING

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Abstract

The study was conducted to identify the knowledge, perceptions and awareness on animal and plant biodiversity in Malaysia among the Diploma of Science students who have taken the Biodiversity and Evolution of Plantae and Animalia course. A project was given to the students within eight weeks. Questionnaires were distributed among the students at the end of the project about general biodiversity issues. A total of 75 questionnaires were returned. The respondents categorized the major issues that threatened the biodiversity in Malaysia. They also identified the five most importance animals to be conserved. The respondents also identified activities that have negative impact on biodiversity in Malaysia. The respondents showed positive perceptions on conserving the environment and positive awareness on biodiversity. This study may provide information in planning projects that may promote awareness on biodiversity and creating or developing conservation programmes among teenagers.

Key words: Biodiversity, conservation, awareness, survey, Project-Based Learning

INTRODUCTION

In fulfilling the human needs in this challenging world, human demands on food, construction, transportation, technology, water and other resources has increased in this century. Unfortunately, in supplying human needs one or more natural resources have to be sacrificed. Global warming may be a product of increasing of these resources. For example, forests and reserves were cleared for residence, cultivation and industries; high consumption of fuel and carbon emission from factories, vehicles and habitations (Syakirah *et al*., 2011)

The term biodiversity was first used more than 20 year ago (Wilson, 1988). The term biodiversity encompasses a broad spectrum of biotic scales, from genetic variation within species to biomes of the planet and is frequently described in terms of numbers of genotypes, species or ecosystems (IUCN, UNEP and WWF, 1991).

Natural ecosystems are being converted to agricultural land at an unprecedented rate worldwide (Green *et al*., 2005). Altered biodiversity either from the loss of species or the

introduction of exotic species has lead to widespread concern for a number of both market (e.g. for medicines) and non-market (e.g. ethical and aesthetic) reasons (Hooper *et al*., 2005).

Convention on Biological Diversity, an international treaty which aims to conserve the diversity of life on earth to maintain the world's ecological sustainability. Furthermore, Public Education and Awareness (Article 13) of the Convention's Articles are intrisically capital-demanding and human resource-intensive activities (Braschler *et al.,* 2010).

To conserve biodiversity, more efforts have to be undertaken to educate people accordingly. In Diploma of Science programme, students are introduced to a wider and deeper biodiversity content compared to what students have learned in secondary schools.In a normal lecture-centred approach the content of the course was delivered by a teacher or lecturer and it was passively received by the students.

Project-Based Learning (PjBL) has five criteria which are centrality, driving question, constructive investigations, autonomy and realism (Thomas, 2000). PjBL is a more effective means of adapting to students' various learning styles or "multiple intelligences" (Gardner, 1991) than is the traditional instructional model (e.g., Diehl *et al*., 1999) because of its various features. Thomas (2000) has concluded that PjBL has value for enhancing the quality of students' learning in subject matter areas, leading to the tentative claim that learning higher-level cognitive skills via PjBL was associated with increased capability on the part of students for applying those learnings in novel, problem solving contexts.

Based on the PjBL criteria mentioned above, this study was conducted to identify the respondents general knowledge, willingness and perception on animal and plant diversity after going through the PjBL process.

RESEARCH METHOD

A mini project was given to the Semester Two Diploma of Science students who were taking the Biodiversity and Evolution of Plantae and Animalia course. About 90% of the students were 18 years old and the rest were between 19 to 20 years old. Students have to work in a group of 4 or 5 members to accomplished the task in eight weeks. Students were given choices to choose either the plant biodiversity or animal biodiversity to be investigated. Each group has to identify ten organisms and each has to be elaborated scientifically including scientific name, local name, family and key characteristics. The species status, values (economical or medicinal), scientific measurements and photographs were included.

There were 95 students from two lecture groups involved and there were 20 project groups altogether. The students planned and organized their own visits to several places to conduct the mini project. Facilitation was given to the students from time to time within the eight weeks.

There were two types of deliverables expected from the mini project which were written reports and oral presentation. Specific format was given for written reports and the students were free to deliver their oral presentation which was scheduled for 15 minutes. Besides normal *Powerpoint* presentation, some groups have initiative to learn Prezi on their own while some groups presented the project through forums and news. There were eight groups presented plant biodiversity and another twelve groups presented animal biodiversity. There were several places visited by the students to conduct the mini project for example National Zoo, Birds Park and Sanctuary, Forest Research Institute Malaysia, Bukit Cherakah Botanical Garden and many other places including parks and reserves near their hometown. The students showed an active participation in Question and Answer sessions after each presentation.

All students were given a Biodiversity questionnaires containing questions of general knowledge about biodiversity, identifying valuable habitats, biodiversity threat and species concervation concern in Malaysia, willingness and perceptions on biodiversity of plants and

animals and conservation programmes. The questionnaires was developed by one of the researcher and contained 30 questions. There were four general knowledge questions, three identifying valuable habitats questions, four biodiversity threat and species concervation questions, fourteen willingness questions and seven perception questions. The questionnaires were validated by three Biodiversity lecturers and the questionnaires were also been answered by two previous batches of the same course.

The samples of 95 students were purposedly chosen from the lecture groups which were taught by the same lecturer. There were 75 answered questionnaires returned since the respondents were not forced to answer the questionnaires. The answers were marked for general knowledge and analyzed quantitatively (percentage and descriptive). There were four general knowledge questions whereby respondents were given choices of answers. For identifying valuable habitats and biodiversity threat and species concervation questions respondents were given list of choices. There were willingness questions where respondents needed to confirm by giving 'yes' or 'no' answer. Respondents were also given four choices of Likert scale (1 = strongly disagree, 2 = diagree, 3 = agree, 4 = strongly agree) for other willingness and perception questions. There were eight negative items which the scales were reversed during analysis.

RESULT AND DISCUSSION

General knowledge about biodiversity

There were four general knowledge of biodiversity multiple choice questions asked in the questionnaires. A total of 49% respondensts answered correctly for the question *Internationational Year of Biodiversity* (Fig. 1). Meanwhile 99% identify the *biodiversity* correctly. There were 79% and 37% answered correctly the questions for *forest percentage of world's biodiversity* and *bee pollination proportion*, accordingly.

Valuable habitat

There were six broad habitat types in Malaysia namely highland forest, lowland forest, mangrove forest, wetland, river system and plantations listed in the questionnaires. Respondents ranked the habitat from most valuable to least valuable for local wildlife. Results showed that respondents ranked lowland forest as the most valuable habitat for local wildlife and the plantations as the least valuable habitat (Fig. 2).

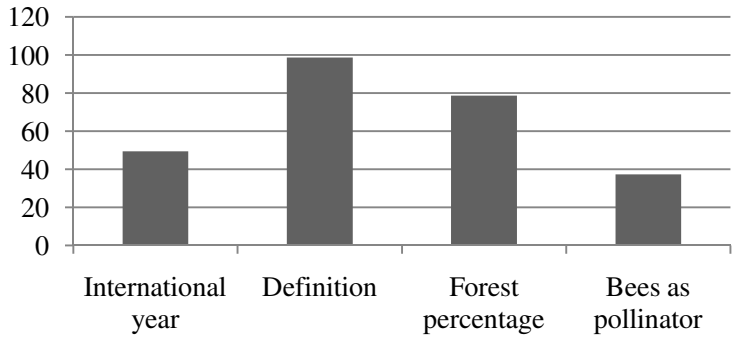

Figure.1 Respondent's general knowledge about biodiversity

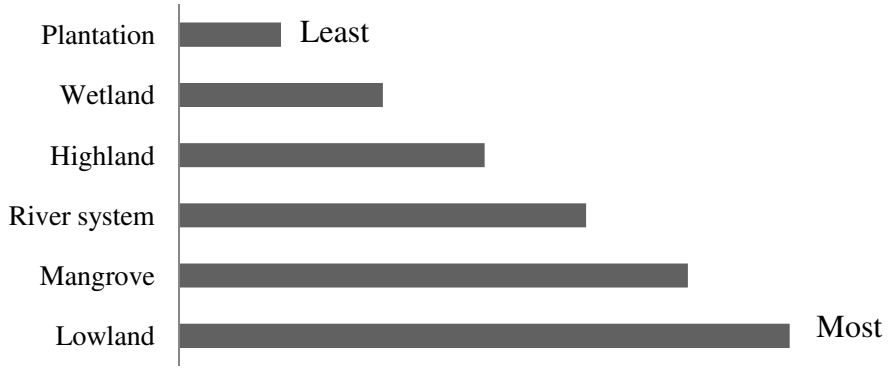

Figure. 2 Ranking the valuable habitats

Greatest threats to biodiversity issues in Malaysia

The respondents were given seven issues that might threaten biodiversity in Malaysia which were climate change, invasion of non-native species, habitat loss and fragmentation, poor management practices, lack of awareness, lack of funding and lack of information. Respondents have to identify the greatest threat issues.

Habitat loss and fragmentation was chosen as the first greatest issue as it scored 39% (Fig. 3). This followed by climate change (28%), lack of awareness (22%) and poor management practices (11%). Other issues were not chosen by the respondents.

Priority species for conservation concern

Respondents were given a list of plants and animals including some endangered species (Fig 4). Respondents have to choose five organisms that benefited from additional conservation action.

Respondents have chosen five important organisms that benefited from the conservation program which were elephant (79%), tiger (77%), rafflesia (64%), mangrove sp. (55%) and meranti (36%).

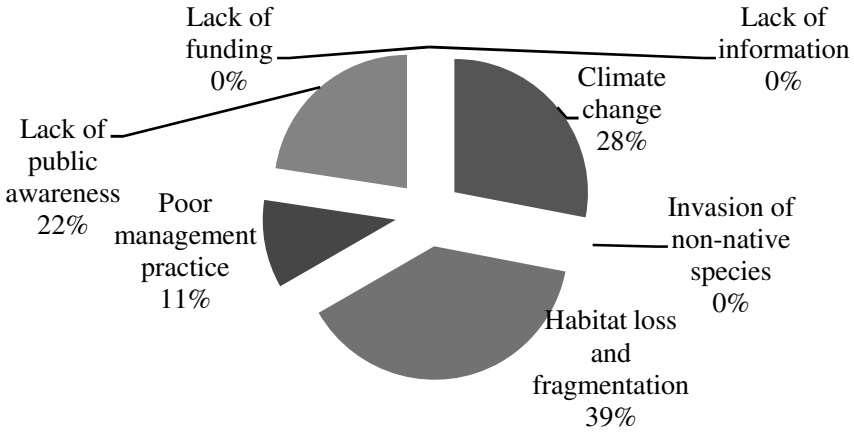

Figure. 3 Greatest issue which threats biodiversity

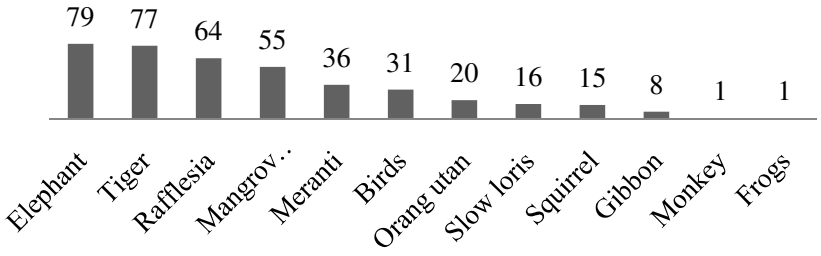

Figure. 4 Important plants and animals benefitted from conservation programme

Participation in environmental monitoring programme

The respondents were explained that the environmental monitoring programme would involved recording any sightings of key animals or plants and supplying the information to the university for updting the database.

A total of 81% of respondents (Fig. 5) agreed to participate the programme and 32% preferred to submit data online, 21% preferred data sheets and 47% preferred training or guided walks (Fig. 6) to share the information.

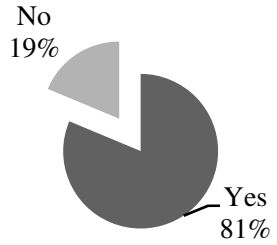

Figure. 5 Participation in environmental monitoring programme

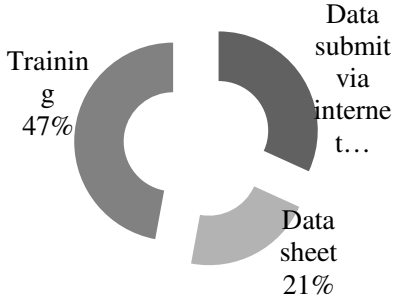

Figure 6 Preferred sharing tools

Volunteer for wildlife conserving programme

Thee were 81% of respondents agreed to be volunteers for wildlife conserving programme.

Extinction of species are interrelated

The respondents were asked on their agreement about organisms interaction whereby extinction of certain organisms will affect others. A total of 93% of respondents agreed with the statement.

Willing to support the conservation programme

Respondents were given ten related items (Table 1). The average mean was 3.07 showed that the respondent agreed to support the programme. Two items scored the highest means (item 2 and 3) and item 4 scored the lowest.

Table 1 Items for willingness to support the conservation programme

	Item	Mean
1.	Donate money for wildlife conservation programme	3.1
2.	Conserving ecosystem is my responsibility, not government	3.5
3.	My actions do not threat biodiversity	3.5
4.	Have to take care the environment	2.3
5.	Bother to take care the environment	3.4
6.	Contribute to protect the ecosystem	3.0
7.	Report to local relevant agencies for any deforestation problem	3.2
8.	Inform media for any problem related to biodiversity	2.7
9.	Take first action before others for any problem related to biodiversity	2.9
10.	Pay more for environmental friendly products	3.1
	Average Mean	3.07

Perception on conservation programme

Respondents were given seven related items (Table 2). The average mean was 3.29 showed that the respondent had positive perceptions towards the conservation programme. Item 1 scored the highest mean and item 5 scored the lowest.

Table 2 Items for perception on conservation programme

	Item	Mean
1.	Disturbed environment affect biodiversity	3.7
2.	People will respect those who conserve wildlife	3.3
3.	Wasting papers contibute to ecosystem depletion	3.3
4.	Using a lot of water have effect on natural habitat	2.9
5.	Big companies contribute in conserving biodiversity	2.7
6.	Illegal logging affect elephants and tigers	3.6
7.	Conserving elephant contribute in protecting the nature	3.5
	Average Mean	3.29

These results showed that the respondents abled to identify biodiversity and these was due to their experienced studying the course and undergone the PjBL. The result for identifying biodiversity was contradicted to Greene (2004) which claimed that the last decade academic biology and (Hershey 1996; Yore and Boyer, 1997) claimed that the knowledge about biodiversity declined in consequence of school biology has become increasingly dominated by physiology, molecular biology and genetics. The respondents of this study has undergone the World of Cell course in the previous semester and these further affirm the differences from the previous studies.

The respondents showed their understanding about biodiversity, willingness and positive perception due to their exposure to PjBL besides frequent interactive lecture sessions. This was supported by Kassas (2002) stated that introducing activities that promote awe and wonder of the living world, and a sensitivity to care for organisms and their habitats, a personal association with nature can be developed.

CONCLUSION AND SUGGESTION

From this study, it was shown that given opportunity to learn biodiversity using PjBL has a fruitful outcomes. Respondents showed their interest to search more information about general knowledge about biodiversity rather than depending on the lecture per se. The respondents showed their ability to decide on several questions asked, showed they were applying the centrality criteria of PjBL. Respondents also showed their willingness to support the conservation programme as well as being positive on conservation programme.

Other studies might explore on public respondents, promoting citizen science, children's awareness and synergizing research and education about biodiversity and conservation.

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